AVESF

HARTCROWSER

Earth and Environmental Technologies

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530
www.hartcrowser.com

J-2296-07

why wasn't monit well MW-11 measured?

April 28, 1999

Mr. Gregory A. Rapp
Construction Services Manager
Potlatch Corporation
1100 Railroad Avenue
P.O. Box 386
St. Maries, Idaho 83861

Re: First Quarter 1999 Performance Report
Avery Landing Recovery System

Dear Mr. Rapp:

Hart Crowser is pleased to present the First Quarter 1999 Performance Report for the Avery Landing free product recovery system. This letter report presents the first quarter groundwater elevations, product thickness measurements, and recovered free product volume.

GROUNDWATER AND PRODUCT QUARTERLY MONITORING

why couldn't measure gw elev in MW-11 (Covered w/ snow?)

Three extraction wells (EW-2 through EW-4), three monitoring wells (HC-1, HC-4, and MW-5), and one piezometer (P-1) were monitored on March 18, 1999. At each monitoring location, depth to product and depth to groundwater measurements were performed using a Flexidip, a free product measuring device. The groundwater elevations at EW-1 and P-2 were calculated from measured elevations at surrounding wells. The river elevation adjacent to extraction well vault EW-3 was also monitored by measuring the elevation difference between the top of the vault and the river. The river elevations at the remaining three extraction well vaults were calculated based on the average slope of the river bottom and the distance between vaults. These measurements and calculations are presented with those of previous monitoring rounds in Table 1. Well locations and current groundwater contours are shown on Figure 1.

During the March 18 site visit, the extraction system was not maintaining a water table depression along the St. Joe River. The extraction well operation was observed as follows:

- EW-1 is no longer in use, as described in the 1998 Annual Report;
- EW-2 was operating and maintaining groundwater capture as indicated on Figure 1;
- EW-3 was operating, but was not maintaining groundwater capture. This could be the result of high groundwater flow due to spring runoff; and
- EW-4 was not operating during the March 18 site visit because of pump failure. During the site visit on April 6, 1999, the motor and pump had been replaced, and EW-4 is currently operating.

During weekly system monitoring done by Potlatch, free product was discovered in the ditch on the opposite side of the road. We planned to excavate the ditch to determine if the treatment system re-injection piping had a leak. On April 6, 1999, we excavated in the area of the re-injection trench and we discovered a significant amount of free product in the soil. While locating the injection piping, we broke the pipe. We, therefore, could not tell if the pipe was already broken prior to our excavation. After repairing the pipe, the system was restarted. Once again, water was observed in the ditch about one week later. Other than residual free product in the ditch, no further free product has been observed since then. Absorbent booms have been placed in the ditch to catch any residual free product encountered.

We have not been able to determine the source of the product in the soil above the re-injection piping. The source could be an unknown spill from the former storage tank that was located just up the hill. Another possibility is the treatment system water depression pumps are transferring free product from the extraction area to the re-injection area. To minimize the possibility of the total fluids pumps transferring free product we reset the level control probes. This may reduce the system's ability to maintain groundwater capture.

FREE PRODUCT RECOVERY

The total volume of free product in the recovery tank is approximately 640 gallons. The 1998 Annual Report contained an error in estimated free product recovery. The treatment system is currently recovering about 50 gallons per quarter.

PROJECT SCHEDULE

Table 2 presents the project schedule for the remainder of 1999. Since the groundwater extraction system will be operating year-round during 1999, the second quarterly monitoring event corresponds to the second quarter of the calendar year. As indicated, we plan on performing the next monitoring event on June 24, 1999, and will submit the second quarter monitoring report by

July 16, 1999. If you should decide that this date needs to be altered, please let us know as soon as possible.

Table 2 - Avery Landing Recovery System
Remaining Project Schedule for 1999

Remaining Schedule	Date
Conduct Second Quarter Monitoring	June 24, 1999
Submit Second Quarter Performance Report	July 16, 1999
Conduct Third Quarter Monitoring	August 12, 1999
Submit Third Quarter Performance Report	September 3, 1999
Conduct Fourth Quarter Monitoring	September 28, 1999
Submit Fourth Quarter Performance Report	November 9, 1999
Submit Annual Report	February 5, 2000

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar location, at the time the work was performed. It is intended for the exclusive use of the Potlatch Corporation for specific application to the referenced property.

If additional information or clarification is required, please call Terry Montoya at (206) 324-9530.

Sincerely,

HART CROWSER, INC.

TERRY MONTOYA
Project Engineer

MATT SCHULTZ, P.E.
Senior Associate Engineer

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Attachments:
Table 1 - Avery Landing Groundwater and River Monitoring Data
Figure 1 - Avery Landing Third Quarter, Groundwater Flow Direction Map

cc: Kreg Beck, Idaho Department of Environmental Quality

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
EW-1	10/27/94	ND	11	0	95.34	84.34
	6/30/95	ND	10.9	0	95.34	84.44
	9/21/95	11.25	11.27	0.02	95.34	84.07
	7/11/96	ND	9.74	0	95.34	85.60
	9/11/96	ND	10.88	0	95.34	84.46
	11/5/96	ND	11.94	0	95.34	83.40
	7/17/97	ND	10.38	0	95.34	84.96
	10/9/97	ND	13.17	0	95.34	82.17
	6/25/98	ND	10.01	0	95.34	85.33
	8/12/98	NM	10.52	0	95.34	84.82
	10/22/98	Sheen	10.86	0	95.34	84.48
	3/18/99				95.34	85.57 ****
EW-2	10/27/94	ND	10.37	0	95.24	84.87
	6/30/95	10.57	10.89	0.32	95.24	84.35
	9/21/95	13.9	13.92	0.02	95.24	81.32
	7/11/96	11.03	11.66	0.63	95.24	83.58
	9/11/96	Sheen	14.00	0	95.24	81.24
	11/5/96	Sheen	12.27	0	95.24	82.97
	7/17/97	8.99	9.09	0.1	95.24	86.15
	10/9/97	Sheen	15.44	0	95.24	79.80
	6/25/98	9.19	9.64	0.45	95.24	85.60
	8/12/98	NM	9.99	0	95.24	85.25
	10/22/98	Sheen	10.94	0	95.24	84.30
	3/18/99	10.17	10.27	0.1	95.24	84.97
EW-3	10/27/94	ND	10.05	0	95.78	85.73
	6/30/95	9.35	9.8	0.45	95.78	85.98
	9/21/95	10.92	11.08+	0.16	95.78	84.70
	7/11/96	8.53	8.64	0.11	95.78	87.14
	9/11/96	10.75	11.70	0.95	95.78	84.08
	11/5/96	Sheen	11.8	0	95.78	83.98
	7/17/97	9.13	9.33	0.2	95.78	86.45
	10/9/97	10.9	11.68	0.78	95.78	84.10
	6/25/98	8.78	9.43	0.65	95.78	86.35
	8/12/98	NM	11	0	95.78	84.78
	10/22/98	12.58	13.38	0.8	95.78	82.40
	3/18/99	9.03	9.23	0.8	95.78	86.55

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
EW-4	10/27/94	ND	8.05	0	94.32	86.27
	6/30/95	7.84	7.85	0.01	94.32	86.47
	9/21/95	8.22	8.24	0.02	94.32	86.08
	7/11/96	Sheen	6.44	0	94.32	87.88
	11/5/96	Sheen	8.08	0	94.32	86.24
	7/17/97	Sheen	5.43	0	94.32	88.89
	10/9/97	Sheen	7.11	0	94.32	87.21
	6/25/98	5.28	5.3	0.02	94.32	89.02
	8/12/98	NM	8.98	0	94.32	85.34
	10/22/98	ND	8.98	0	94.32	85.34
	3/18/99	5.18	5.26	0	94.32	89.06
HC-1	10/27/94	ND	13.25	0	97.50	84.25
	6/30/95	ND	12.00	0	97.50	85.50
	9/21/95	NM	13.42	0	97.50	84.08
	7/11/96	ND	11.92	0	97.50	85.58
	9/11/96	ND	12.90	0	97.50	84.60
	11/5/96	Could not locate due to snow				
	7/17/97	ND	11.27	0	97.50	86.23
	10/9/97	ND	12.87	0	97.50	84.63
	6/25/98	ND	11.85	0	97.50	85.65
	8/12/98	NM	12.97	0	97.50	84.53
	10/22/98	ND	13.1	0	97.50	84.40
	3/18/99	ND	11.7	0	97.50	85.80
HC-4	10/27/94	13.3	15.34	2.04	98.94	83.60
	6/30/95	11.89	15.49	3.6	98.94	83.45
	9/21/95	13.67	NM	NM	98.94	85.27
	7/11/96	11.58	12.93	1.35	98.94	86.01
	9/11/96	13.53	13.93	0.40	98.94	85.01
	11/5/96	11.82	13.62	1.80	98.94	85.32
	7/17/97	11.65	13.25	1.60	98.94	85.69
	10/9/97	12.67	14.92	2.25	98.94	84.02
	6/25/98	11.53	12.49	0.96	98.94	86.45
	8/12/98	NM	13.9	NM	98.94	85.04
	10/22/98	10.3	14.7	4.40	98.94	84.24
	3/18/99	10.5	14.05	4.40	98.94	84.89
HC-5	11/5/96	ND	11.22	0	97.95	86.73
	7/17/97	Monument under standing water				
	10/9/97	Monument under standing water				
	6/25/98	Lost during road construction				

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
MW-4	9/14/94	ND	12.88	0	99.76	86.88
	6/30/95	ND	10.19	0	99.76	89.57
	9/21/95	ND	11.95	0	99.76	87.81
	7/11/96	Sheen	10.18	0	99.76	89.58
	9/11/96	Sheen	11.33	0	99.76	88.43
	11/5/96	Lost during road construction				
MW-5	10/27/94	ND	10.45	0	97.76	87.31
	6/30/95	ND	9.13	0	97.76	88.63
	9/21/95	ND	10.83	0	97.76	86.93
	7/11/96	ND	8.98	0	97.76	88.78
	9/11/96	ND	10.71	0	97.76	87.05
	11/5/96	ND	10.65	0	97.76	87.11
	7/17/97	ND	8.75	0	97.76	89.01
	10/9/97	ND	10.89	0	97.76	86.87
	6/25/98	ND	8.56	0	97.76	89.20
	8/12/98	NM	10.68	0	97.76	87.08
	10/22/98	ND	13.5	0	97.76	84.26
	3/18/99	ND	8.8	0	97.76	88.96
MW-11	9/14/94	12	NA	NA	98.16	NA
	6/30/95	5.54	7.25	1.71	98.16	90.41
	7/11/96	6.34	10.00	3.66	98.16	88.16
	9/11/96	3.25	7.20	3.95	98.16	90.96
	11/5/96	3.05	7.20	4.15	98.16	90.96
	7/17/97	6.33	9.99	3.66	98.16	88.17
	8/12/98	NM	3.90	NM	98.16	94.26
	10/22/98	6.96	8.00	1.04	98.16	90.16
P-1	10/27/94	ND	17.31	0	101.42	84.11
	6/30/95	ND	16.72	0	101.42	84.70
	9/21/95	ND	17.4	0	101.42	84.02
	7/11/96	ND	15.87	0	101.42	85.55
	9/11/96	ND	16.98	0	101.42	84.44
	11/5/96	ND	17.06	0	101.42	84.36
	7/17/97	ND	15.34	0	101.42	86.08
	10/9/97	ND	17.64	0	101.42	83.78
	6/25/98	ND	14.53	0	101.42	86.89
	8/12/98	NM	16.72	0	101.42	84.70
	10/22/98	ND	15.6	0	101.42	85.82
	3/18/99	ND	15.65	0	101.42	85.77

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
P-2	10/27/94	ND	15.87	0	100.06	84.19
	6/30/95	ND	15.26	0	100.06	84.80
	9/21/95	ND	16.04	0	100.06	84.02
	7/11/96	ND	14.52	0	100.06	85.54
	9/11/96	ND	15.62	0	100.06	84.44
	11/5/96	ND	15.08	0	100.06	84.98
	7/17/97	ND	13.92	0	100.06	86.14
	10/9/97	ND	16.09	0	100.06	83.97
	6/25/98	ND	15.95	0	100.06	84.11
	8/12/98	NM	15.3	0	100.06	84.76
	10/22/98	NM	16.95	0	100.06	83.11
	3/18/99	NM				86.02 ****
River at EW-1	10/27/94					83.12 *
	6/30/95					84.03 **
	9/21/95					82.24
	7/11/96					83.74 ***
	9/11/96					82.56
	11/5/96					83.16
	7/17/97					82.39
	10/9/97					83.00
	6/25/98					85.22
	8/12/98					85.42
	10/22/98					85.00
	3/18/99					83.93
River at EW-2	10/27/94					84.41
	6/30/95					85.32
	9/21/95					83.53
	7/11/96					85.03
	9/11/96					83.85
	11/5/96					83.59
	7/17/97					85.35
	10/9/97					84.20
	6/25/98					86.42
	8/12/98					86.62
	10/22/98					86.20
	3/18/99					85.13

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
River at EW-3	10/27/94					85.16 *
	6/30/95					86.07
	9/21/95					84.28
	7/11/96					85.78 ***
	9/11/96					84.60
	11/5/96					84.10
	7/17/97					86.31
	10/9/97					85.16
	6/25/98					85.16
	8/12/98					85.65
	10/22/98					85.23
	3/18/99					86.10
River at EW-4	10/27/94					86.49 *
	6/30/95					87.40
	9/21/95					85.61
	7/11/96					87.11 ***
	9/11/96					85.93
	11/5/96					86.44
	7/17/97					87.27
	10/9/97					86.12
	6/25/98					88.34
	8/12/98					88.54
	10/22/98					88.12
	3/18/99					87.05

Notes:
All measurements in feet.
* River elevation was extrapolated from the river surface slope measured in 1995 and the river elevation measured south of EW-2 in 1994.
** River elevation was extrapolated from river surface slope, based on river elevations measured south of EW-2, EW-3, and EW-4 in 1995.
*** River elevation was extrapolated from river surface slope, and the wood dock benchmark.
**** Groundwater elevation was interpolated from measured elevations at EW-2 and P-1

T.O.C. - Top of Casing
ND - Not Detected
NA - Not Available
NM - Not Measured

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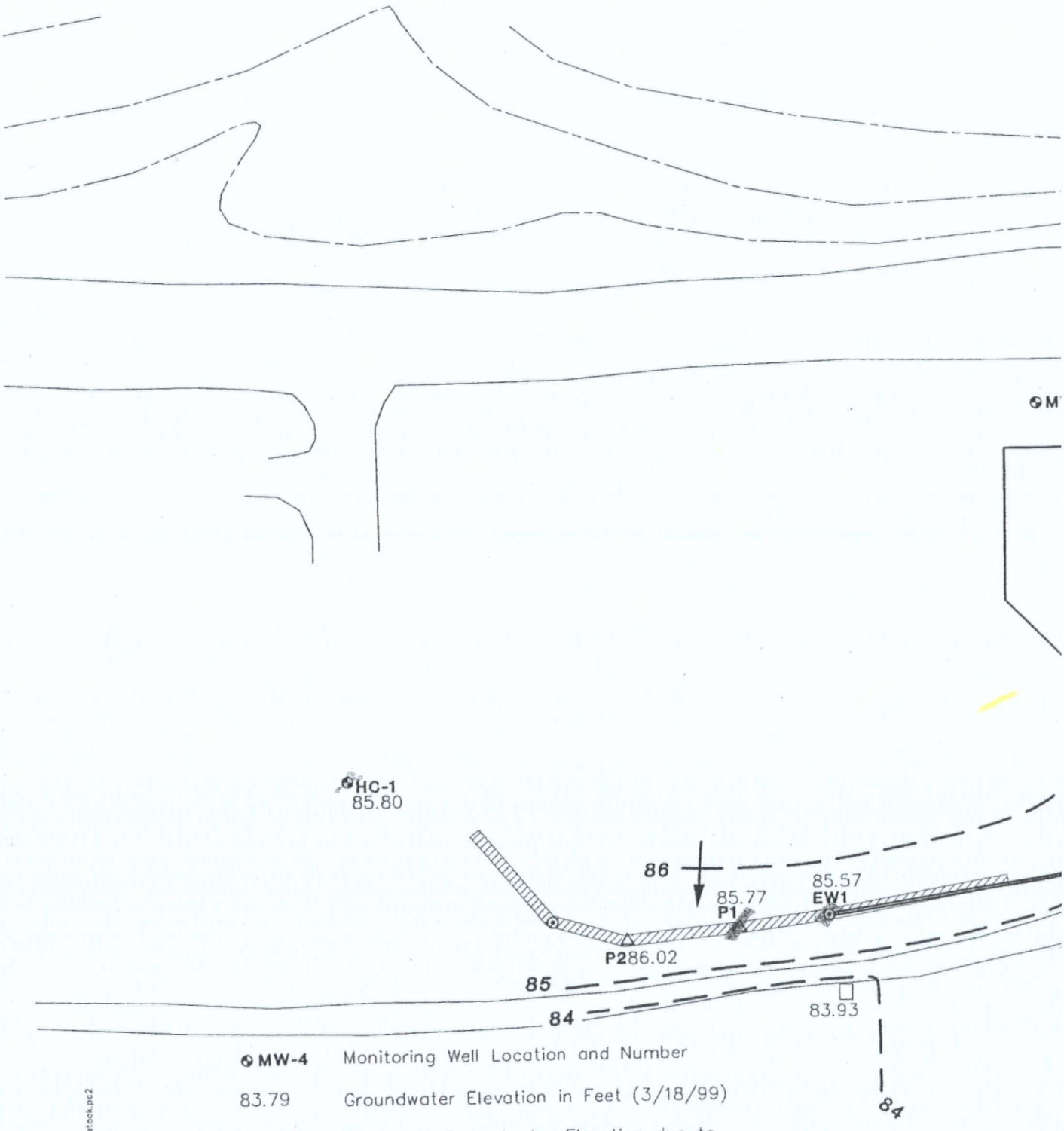
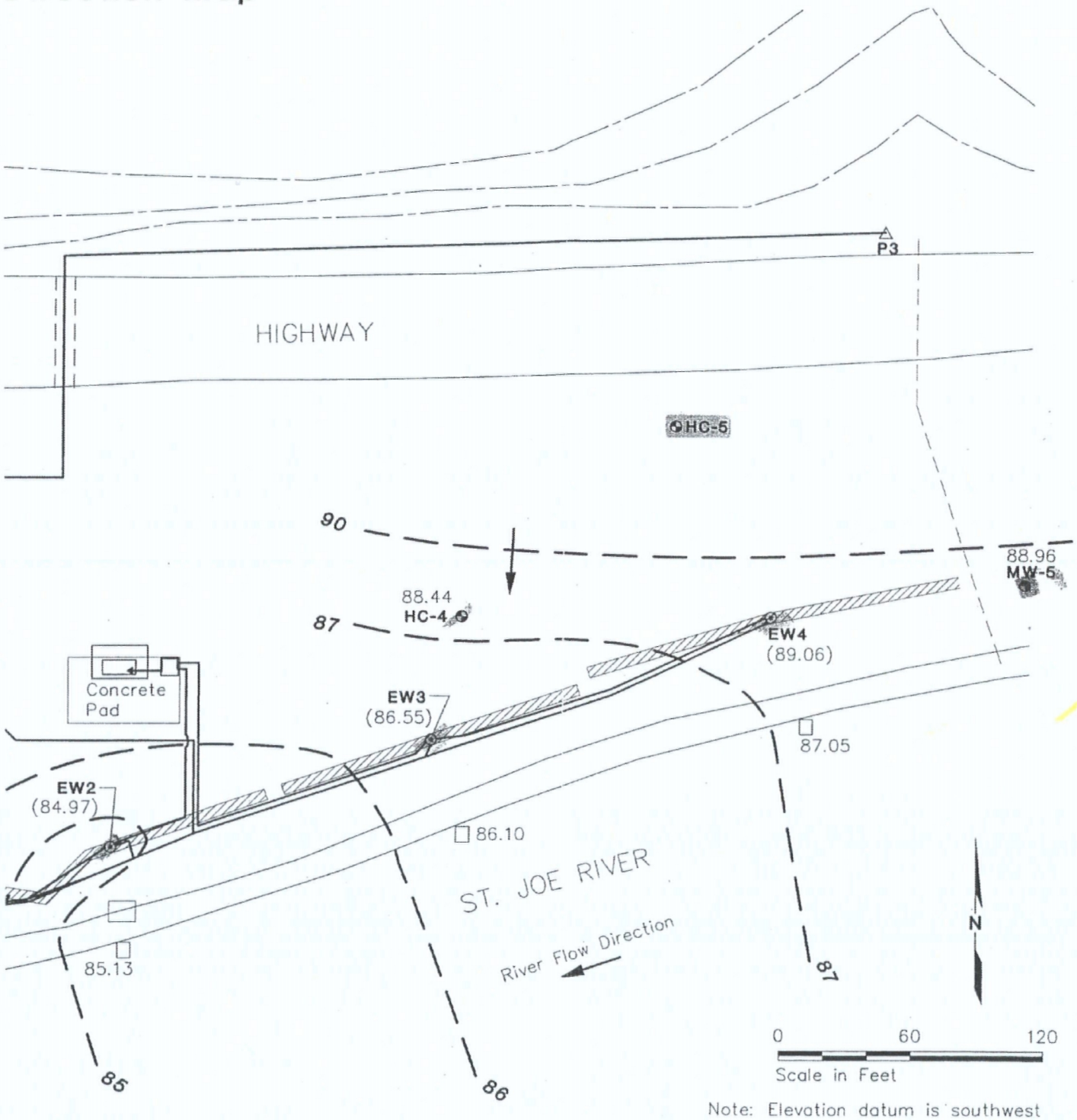
Avery Landing First Quarter 1999 Groundwater Flow



⊙ MW-4	Monitoring Well Location and Number
83.79	Groundwater Elevation in Feet (3/18/99)
(86.69)	Corrected Groundwater Elevation due to Free Product in Feet (3/18/99)
⊙ EW1	Extraction Well Location and Number
△ P1	Piezometer Location and Number
⊙ HC-5	Lost During Construction (1997)

CVD 4/23/99 1=60 woodstock.pc2
22960705

Direction Map



Note: Elevation datum is southwest corner of Concrete Pad (100.00 feet)

87.40 Estimated River Elevation in Feet (3/18/99)

Groundwater Elevation Contour in Feet

Approximate Groundwater Flow Direction

Extraction Trench

HARTCROWSER

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Figure 1